DOCUMENT RESUME

ED 324 018 IR 053 293

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TITLE Learning To Live with Complexity.
PUB DATE 6 Apr 90
NOTE 12p.; Paper presented at the Annual Alumni Reunion of the School of Information and Library Studies, University of Michigan (Ann Arbor, MI, April 6, 1990).
PUB TYPE Viewpoints (120) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Cooperation; Ethics; *Futures (of Society); Humanism; *Human Relations; Information Needs; *Information Scientists; Interaction; Interdisciplinary Approach; International Cooperation; Interpersonal Communication; *Librarians; Social Change; *Users (Information); Values Clarification

ABSTRACT

Neither the design of information systems and networks nor the delivery of library services can claim true user centricity without an understanding of the multifaceted psychological environment of users and potential users. The complexity of the political process, social problems, challenges to scientific inquiry, entrepreneurship, and technological competition is the underlying characteristic of the present information environment. Information professionals must learn to live with complexities in order to strengthen the positive forces in society, to create optimal situations exploiting knowledge on behalf of individuals and society, and to fight persistent problems with all available tools of knowledge. Research into information requirements and the interrelatedness of different cognitive processes is probably the most needed research for future policies and systems. Information scientists, librarians, information resources managers, archivists, records managers, information counselors, and other roles emerging in response to the complex information market must reach out to each other and bridge the divisive lines of professional roles to sustain professional values and ethical approaches to complex information issues. Such issues include the challenges presented by multicultural local communities, the globalized world economy, the need for unbiased facts for the nonscientific or nonlegal information user, rapid and powerful advances in information technology, and the need for information for interdisciplinary solving of social and economic problems. (SD)

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LEARNING TO LIVE WITH COMPLEXITY

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Marta Dosa

I chose this title for my presentation because being attuned to society's wavelengths is the essence of all information-related work. Neither the design of information systems and networks nor the delivery of library services can claim true user-centricity without an understanding of the multifaceted psychological environment of users and potential users.

What do we know about the world we live in? What turbulences, transformations and undercurrents shape the knowledge needs of today? What motivates people to "find out?" How do we make our choices? It appears to me that complexity -- in the way we live, work, learn, think, play and communicate -- affects our thoughts and actions more powerfully than we realize. The complexity of the political process, social problems, challenges to scientific inquiry, entrepreneurship and technological competition is the underlying characteristic of the present information environment.

Probably nothing expresses today's complexity more than the confluence of different things and trends. The interrelatedness of economic productivity, human values, and the quality of life has created beautiful

IR053293

Address delivered at the Annual Alumni Reunion of the School of Information and Library Studies, The University of Michigan, April 6, 1990.

as well as tragic complexities. Medical ethics, multicultural communities, desktop publishing on thousands of topics, public participation in the political process are good complexities. Homelessness, substance abuse, toxic waste, violence are bad complexities.

We have to learn to live with complexities in order to strengthen the positive forces in society and to fight persistent problems by all available tools of knowledge.

The relationship between change and complexity has been the focus of study for decades. In 1972, the architect Royston Landau suggested in Architectural Digest that "both our relationships with the real world and our theoretical understandings about complexity have changed to the extent that the term complexity itself, which belongs to a static, state-describing vocabulary, needs to be supplemented by a dynamic, process-describing word such as complexing."

Even the style of inquiry by which we seek knowledge is intensively studied. John Zeisel in his work Inquiry by Design noted that both research and design are difficult to grasp because they include "intangible elements such as intuition, imagination and creativity." In recent decades, the linear cause-and-effect approach to problem solving has given way to the recognition that, as S. C. Pierce expressed it, "we have to accept the complete interdependence and interrelation of all things."

The social environment of our information systems, libraries and services is being molded by the dominant stream of our culture: con-

tinuous and intensive transformations. How do we recognize change that results in complexity?

Let me invite you to a walk in the magnificent landscape of ideas. We will visit three lands where the currents of changing concepts have recently culminated in new perceptions. Each of these landscapes represents a field of study where interrelatedness was embraced.

The first land we will visit is science where the quest for the new must meet the test of verification or logical deduction. From the landscape of the emerging field of earth systems science beckons a revolutionary and untested idea: the Gaia hypothesis. First proposed by James Lovelock in 1974, rejected or ignored by most scientists, the idea was restated by Lovelock and Margulis in their paper "Ages of Gaia" at the conference of the American Geophysical Union in 1988. Graced by the name of the Greek goddess of the earth, this total systems view conceives of all living things on our planet interacting with chemical and geophysical processes to sustain atmospheric conditions suitable for life. Indeed, global climate changes are leading teams of scientists to study the oceans, climate, land, living organisms, and atmospheric changes to contemplate the interrelationships of phenomena.

Now we will walk into another land where the concepts and applications of cognitive science are studied. Changes in perceptions here, are likely to affect the use and design of information systems in the future. In this landscape, Terry Winograd and Fernando Flores have introduced nontraditional notions such as "models of rationalistic problem solving which do not reflect how actions are determined" in life. Therefore, "computer programs based on rationalistic models cannot succeed." Their

book, Understanding Computers and Cognition rejects several longstanding paradigms in favor of an approach that recognizes the value of individual interpretation and intuitive understanding of the world around us. Interrelatedness is expressed by the image of the computer not as a piece of technology but as a component in a social network of institutions, actions, meanings, and interacting processes.

The study of corporate cultures presents to us the third of these dramatically changing landscapes. Pragmatic in orientation and increasingly global in scope, management science has entered a phase where interrelatedness is dominant. As often before, Peter Drucker bore witness to the change. In "The Coming of the New Organization" (Harvard Business Review), he tells us that in the organization of the future "the traditional sequence of research, development, manufacturing, and marketing is being replaced by synchrony: specialists from all these functions work together as a team, from the inception of research to a product's establishment in the market." A new vista, a shift in approach... In respect to the new corporate culture, the study of decision making is not only a study of step by step choices. Increasingly, it will be a study of interrelatedness.

And now, please turn your eyes from the landscapes of science to the scenarios of complexity in our everyday work. Let us reflect on five examples, five familiar issues that seem to be characteristic of today's information services.

Multicultural Communities

Our information user communities are becoming ever more diversified and richly pluralistic. We are witnessing the self-organization and self-assertion of not only the ethnically and sexually diversified groups, but also the emergence of the distinct cultures of the handicapped, the aged, the hospital patient. On our campuses, we encounter the multifarious cultures of basic research, applied research, the classroom, the trustees' meetings, the administration, the basketball team, and the students. (Oh, those wondrous cultures of students!)

Within each culture, people are increasingly drawn to the passion of self-expression. Learning is becoming the path of self-help. Policies might be regressive, but the voices dialoguing with policy makers are more distinct. Information is becoming the organizational tool for grassroots activities in city hall, on the campus, in the museum, in the sports arena and in the neighborhood solid waste recycling project.

Globalization

International relations in 1989 erupted into the most unexpected, most fascinating complexities. How do libraries and information systems reflect South Africa after Mandella's release; student life in China and Chinese student visas in the United States; Japanese-U.S. trade relations; the debt burden of poor countries; joint ventures with Czechoslovakia, Hungary, Poland; or the effects of Glasnost on the Russian people?

In international relations, economic and trade information is matching or surpassing the significance of ideological and political literature. American business is moving in the inevitable fast lane of globalization. The rapid transmission of information -- from minute by minute broadcast news capturing the international drama to financial and technological data transmitted by multinational corporations -- has obliterated the traditional division between domestic and global information.

Professional associations are responding to the call of these transformations. The American Library Association has created fellowships for international experience. The Information Industry Association introduced a Global Business Breakthrough Program. Members of The Special Libraries Association are working on projects of partnership with counterparts in the Third World. Globalization has become a reality.

Fact Orientation

The need for facts and data by all types of information users manifests itself at every level. Environmental and consumer activists, AIDS groups, older learners and many others have turned from emotional argumentation to documented and fact-based dissemination of their messages. The complexity of legal and technological developments demands not only the dissemination of information but also the repackaging of facts into easily understandable form for popular consumption. When does data provision turn into data overload? "Above a certain point, increased information is no longer a positive stimulus, and is associated

with a drastic drop in effective response," observe Kirk D. Fiedler and his coauthors in "Managing Complex Decisions" in the Information Executive.

The need for factual information to support presentations at public hearings, in newsletters to neighborhood groups and in the board meetings of community organizations challenges the capacity of information specialists to interpret and condense research reports or legislative and regulatory tracking. This challenge is forging a new kind of information responsibility. The quality, validity and credibility of facts must be preserved in whatever condensed and repackaged form the data are presented. Independently from the politics of the message's organizational context, the facts must remain unbiased. The question is: Can they?

The complexity of data resources created by specialists on the one hand and the need for data by the nonscientific and nonlegal user on the other hand are demanding a new information intermediary role that has barely been recognized.

Information Technology

Advances have been so rapid and powerful that our awareness of new tools and processes have long surpassed our understanding of the social impact of the complex new mechanisms. Consider, for example, videotex. Why has the Minitel System been so successful in France and why has experimentation with Prodigy whose development and marketing has cost 300 million dollars, met with such a cool reception by consumers in the United States?

The Videotex Industry Association has predicted that by the year 2000, in the United States 97 percent of the households will have videotex. A decision by a U.S. district court in 1988 allowed Bell holding companies to supply information gateways for dial-in-information services. AT&T is exploring the introduction of information services via videogames such as Nintendo. Addition of a modem and keyboard to a home TV set enables TV viewers to turn into interactive users of the displayed information.

However, the availability of spectacular new information technology only underscores our lack of understanding of what kinds of public policies are needed for maximizing the benefits of systems. For example, we know that the envelope of traditional mail protects the content under the Fourth Amendment. Will the privacy of E-mail, of the proliferating electronic bulletin boards and of videotex communications be protected? Who will be responsible for establishing the criteria for quality control? Who are the advocates of equity in access to information? These policy questions must be confronted by information professionals because they are related to professional decisions in choosing technology, competing with or utilizing home-based information services, and safeguarding the rights of information users.

Interdisciplines

Information services for users who work in teams on interdisciplinary problems represent the fifth challenge to our everyday work. Both "good" and "bad" complexities created by crises in health care,

occupational safety, the environment, urban life, modes of learning and teaching, rural development, illiteracy, and many other areas of social and economic life present new information needs. These crises bring out the best in individuals and organizations, and they also produce the worst kinds of complexity by the misuse of human misery for profit, unresponsive bureaucratic entities and resistance to change in some social groups.

One of the best answers to economic and social problems has been the emergence of "interdisciplines" which integrate the conceptual approaches and professional skills from several heretofore separate fields of research and applications. Interdisciplines need the vision of interrelatedness of all things.

Kirk D. Fiedler and his coauthors in their previously cited article observe that "it is no longer enough that a manager be good at a specialized skill. Increasing demands of the job force are the cultivation of a wider perspective." How does information affect decision making of teams whose members have disparate backgrounds? The Fiedler group indicates that "The more desirable property of information is synergism. Simply put, if the information is organized and presented in just the right way for a particular problem, the individual pieces reinforce each other and the decision-making process improves greatly."

Now we have to ask: what do these forces of change and complexity in the information user's environment mean for us?

I suggest that we consider three key approaches to our new professional and human responsibilities.

1. We have to accept that our world is highly complex and that the problems of information users and potential users are problems of great interrelatedness fusing many different factors. By embracing complexity and learning to live with it, we can get closer to understanding it. By understanding it, we can create optimal situations for problem solving and exploit knowledge on behalf of individuals and society.

2. We should observe and study complexities rather than merely discuss them. Research into information requirements and situations and into the interrelatedness of different cognitive processes is probably the most needed research for future policies and systems.

3. We must reach out to each other and bridge the divisive lines of professional roles -- information scientist, librarian, information resources manager, archivist, records manager, information counselor, and all the yet unnamed roles emerging in response to a complex market. By studying the new responsibilities, we can be proactive in the creation of new roles rather than merely following the signals of the market. How can we sustain professional values and ethical approaches without supporting each other in this endeavor?

The interrelatedness of so many things in society can defeat us unless we find new active ways of working together. Sharing experience by informal networking may be the best defense against complexity overload. But more than a mere defense, we need new solutions identified through research and policy studies.

I will close by reminding us of an image conjured up by the Russian poet Gumilev. He spoke of a young man who desperately wanted to play the

magic violin. The magic violin had the power to protect him against monsters which would devour him the second he stopped playing.

And I ask you: Will the monsters of runaway complexity in a technologically interrelated world devour us unless we dare to play the magic violin and do what we truly believe in?

We are interrelated by multicultural communities, by globalization, by the increasing need for facts, by information technology and by disciplines that fuse many paradigms.

Are we interrelated as human beings?

Maybe our magic violin is learning to live with complexity, strengthening our professional values and reaching out to each other in the process.